

AMENDMENTS TO THE CLAIMS

1 – 49. (canceled)

50. (new) A process for the production of triacylglycerol, comprising growing a transgenic cell or organism comprising one or more of the following:

a) a nucleotide sequence i) to iv), under conditions whereby said nucleotide sequence

i) is a nucleotide sequence as set forth in SEQ ID NO. 1 or a homologous nucleotide sequence which is at least about 40% identical to a nucleotide sequence of SEQ ID NO. 1,

ii) is a nucleotide sequence or a homolog thereof which is at least about 40% identical to a nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 1, 3, 4, 5, 7, 9, 10, 11, 12, 19, 21, 23, 24, 25, 26, 28, 29, 30 and 31, or a homolog encoding an amino acid sequence for an enzyme or an isoenzyme or a functional fragment thereof;

iii) is a partial nucleotide sequence which corresponds to a full length nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 5, 7, 9, 12, 25, 26, 28 or 31, or a homolog thereof; or

iv) is a nucleotide sequence which is at least 40% identical to a nucleotide sequence selected from the group consisting of those sequences set forth in SEQ ID NO. 1, 3, 4, 5, 7, 9, 10, 11, 12, 19, 21, 23, 24, 25, 26, 28, 29, 30 and 31,

is expressed

b) a gene construct comprising a nucleotide sequence a), operably linked to a heterologous nucleic acid, and
c) a vector comprising a gene construct b), or a nucleotide sequence i)

wherein the activity of PDAT acyltransferase catalytic activity is acyl-CoA independent.

51. (new) A process for the production of triacylglycerol and/or triacylglycerols with uncommon fatty acids, comprising medium chain fatty acids, hydroxylated fatty acids,

epoxygenated fatty acids and acetylenic fatty acids, comprising growing a transgenic cell or organism comprising a nucleotide sequence selected from the group of

- a) is a nucleotide sequence as set forth in SEQ ID NO. 1 or a homologous nucleotide sequence which is at least about 40% identical to a nucleotide sequence of SEQ ID NO. 1,
- b) is a nucleotide sequence or a homolog thereof which is at least about 40% identical to a nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 1, 3, 4, 5, 7, 9, 10, 11, 12, 19, 21, 23, 24, 25, 26, 28, 29, 30 and 31, or a homolog encoding an amino acid sequence for an enzyme, an isoenzyme or a functional fragment thereof,
- c) is a partial nucleotide sequence which corresponds to a full length nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 5, 7, 9, 12, 25, 26, 28 or 31, or a homolog thereof;
- d) is a nucleotide sequence which is at least 40% identical to a nucleotide sequence selected from the group consisting of those sequences set forth in SEQ ID NO. 1, 3, 4, 5, 7, 9, 10, 11, 12, 19, 21, 23, 24, 25, 26, 28, 29, 30 and 31,

or an enzyme selected from the group of

- i) is an enzyme, designated as phospholipid:diacylglycerol acyltransferase (PDAT), catalyzing in an acyl-CoA-independent reaction the transfer of fatty acids from phospholipids to diacylglycerol in the biosynthetic pathway for the production of triacylglycerol and comprising an amino acid sequence as set forth in SEQ ID NO. 2 or an isoenzyme or a functional fragment thereof,
- ii) is an enzyme i), comprising an amino acid sequence as set forth in SEQ ID NO. 16, 20 or 22, or an isoenzyme or a functional fragment thereof,
- iii) is an enzyme i), comprising an amino acid sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 6, 8, 13, 14, 15, 17, 18, 25 and 27, or an isoenzyme or a functional fragment thereof.

52. (new) A process for the production of triacylglycerol, comprising growing a transgenic cell or organism comprising one or more of the following:

a) a nucleotide sequence i) to iv), under conditions whereby said nucleotide sequence

- i) is a nucleotide sequence as set forth in SEQ ID NO. 5 or a homologous nucleotide sequence which is at least about 40% identical to a nucleotide sequence of SEQ ID NO. 5,
- ii) is a nucleotide sequence or a homolog thereof which is at least about 40% identical to a nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 4 and 5 or a homolog encoding an amino acid sequence for an enzyme or an isoenzyme or a functional fragment thereof;
- iii) is a partial nucleotide sequence which corresponds to a full length nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 5 or a homolog thereof; or
- iv) is a nucleotide sequence which is at least 40% identical to a nucleotide sequence selected from the group consisting of those sequences set forth in SEQ ID NO. 4 and 5 is expressed

b) a gene construct comprising a nucleotide sequence a), operably linked to a heterologous nucleic acid, and

c) a vector comprising a gene construct b), or a nucleotide sequence i) wherein the activity of PDAT acyltransferase catalytic activity is acyl-CoA independent.

53. (new) A process for the production of triacylglycerol and/or triacylglycerols with uncommon fatty acids, comprising medium chain fatty acids, hydroxylated fatty acids, epoxigenated fatty acids and acetylenic fatty acids, comprising growing a transgenic cell or organism comprising a nucleotide sequence selected from the group of

- a) is a nucleotide sequence as set forth in SEQ ID NO. 5 or a homologous nucleotide sequence which is at least about 40% identical to a nucleotide sequence of SEQ ID NO. 5,
- b) is a nucleotide sequence or a homolog thereof which is at least about 40% identical to a nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 4 and 5 or a homolog encoding an amino acid sequence for an enzyme or an isoenzyme or a functional fragment thereof,

- c) is a partial nucleotide sequence which corresponds to a full length nucleotide sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 5 or a or homolog thereof;
- d) is a nucleotide sequence which is at least 40% identical to a nucleotide sequence selected from the group consisting of those sequences set forth in SEQ ID NO. 4 and 5 or an enzyme selected from the group of
 - i) is an enzyme, designated as phospholipid:diacylglycerol acyltransferase (PDAT), catalyzing in an acyl-CoA-independent reaction the transfer of fatty acids from phospholipids to diacylglycerol in the biosynthetic pathway for the production of triacylglycerol and comprising an amino acid sequence as set forth in SEQ ID NO. 6 or an isoenzyme or a functional fragment thereof,
 - ii) is an enzyme i), comprising an amino acid sequence selected from the group consisting of sequences as set forth in SEQ ID NO. 6 or an isoenzyme or a functional fragment thereof.

54. (new) The process of claim 50 further comprising isolating triacylglycerol.

55. (new) The process of claim 51 further comprising isolating triacylglycerol.

56. (new) The process of claim 52 further comprising isolating triacylglycerol.

57. (new) The process of claim 53, further comprising isolating triacylglycerol.